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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.        | CONFIRMATION NO. |
|--|-------------|----------------------|----------------------------|------------------|
| 10/500,317   | 06/28/2004  | Shinichi Kawasaki    | 12088/019001               | 9863             |
| 22511  | 7590        | 08/14/2006           |                            |                  |
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|  |             |                      | EXAMINER<br>ZERVIGON, RUDY |                  |
|  |             |                      | ART UNIT<br>1763           | PAPER NUMBER     |

DATE MAILED: 08/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                                      |  |  |
|------------------------------|--------------------------------------|--|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/500,317 | <b>Applicant(s)</b><br>KAWASAKI ET AL. |  |
|                              | <b>Examiner</b><br>Rudy Zervigon     | <b>Art Unit</b><br>1763                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 24 March 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 60-69 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 60-69 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>All</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 60-66 are rejected under 35 U.S.C. 102(a,e) as being anticipated by Denes, Ferencz S. et al. (US 20030129107 A1). Denes teaches a plasma (100; Figure 1,2; [0025]-[0026]) surface processing apparatus (Figure 2; [0025]-[0026]) for processing a surface of a material to be processed (200; Figure 2; [0025]-[0026]) with a processing gas plasmatized (100; Figure 1,2; [0025]-[0026]) under an electric field, said apparatus (Figure 2; [0025]-[0026]) having an electrode structure (Figure 3; [0033]) for generating said electric field, said electrode structure (Figure 3; [0033]) comprising: a metallic electrode body (140; Figure 1,3; [0033]); and a dielectric case (148, 138, 122; Figure 3; [0033]) provided as a solid dielectric layer for said electrode body (140; Figure 1,3; [0033]) and including an integral case body (148, 138; Figure 3; [0033]) which has an opening and an internal space (volume occupied by 140; Figure 3) in which said electrode body (140; Figure 1,3; [0033]) is received, a protrusive end part (300; Figure 1; [0033]) being provided on a side of said opening of said case body (148, 138; Figure 3; [0033]), said protrusive end part (300; Figure 1; [0033]) being protruded relative to said electrode body (140; Figure 1,3; [0033]), as claimed by claim 60

Art Unit: 1763

Denes further teaches:

- i. An electrode structure (Figure 3; [0033]) according to claim 60, wherein said dielectric case (148, 138, 122; Figure 3; [0033]) further includes: a lid (112; Figure 1,3; [0037]) made of a solid dielectric material for closing said opening, an end part of said lid (112; Figure 1,3; [0037]) covering an end surface of said protrusive end part (300; Figure 1; [0033]) in a location more forward in a direction where said protrusive end part (300; Figure 1; [0033]) is protruded relative to said electrode body (140; Figure 1,3; [0033]), as claimed by claim 61
- ii. A plasma (100; Figure 1,2; [0025]-[0026]) surface processing apparatus (Figure 2; [0025]-[0026]) for processing a surface of a material to be processed (200; Figure 2; [0025]-[0026]) with a processing gas plasmatized (100; Figure 1,2; [0025]-[0026]) under an electric field, said apparatus (Figure 2; [0025]-[0026]) having an electrode structure (Figure 3; [0033]) for generating said electric field, said electrode structure (Figure 3; [0033]) comprising: an elongate metallic first electrode body (140; Figure 1,3; [0033]); a first dielectric case (148, 138, 122; Figure 3; [0033]) provided as a solid dielectric layer for said first electrode body (140; Figure 1,3; [0033]) and including an integral first case body (148, 138; Figure 3; [0033]) which has a first opening and a first internal space (volume occupied by 140; Figure 3) in which said first electrode body (140; Figure 1,3; [0033]) is received, a first protrusive end part (300; Figure 1; [0033]) being provided on a side of said first opening of said first case body (148, 138; Figure 3; [0033]), said first protrusive end part (300; Figure 1; [0033]) being protruded relative to said first electrode body (140; Figure 1,3; [0033]); an elongate metallic second electrode (any other 140;

Art Unit: 1763

Figure 1,3; [0033]) extending in a same direction as said first electrode body (140; Figure 1,3; [0033]); and a second dielectric case (any other 148, 138, 122; Figure 3; [0033]) provided as a solid dielectric layer for said second electrode body (any other 140; Figure 1,3; [0033]) and including an integral second case body (148, 138; Figure 3; [0033]) which has a second opening and a second internal space (volume occupied by 140; Figure 3) in which said second electrode body (any other 140; Figure 1,3; [0033]) is received, a second protrusive end part (300; Figure 1; [0033]) being provided on a side of said second opening of said second case body (148, 138; Figure 3; [0033]), said second protrusive end part (300; Figure 1; [0033]) being protruded relative to said second electrode body (any other 140; Figure 1,3; [0033]), said first dielectric case (148, 138, 122; Figure 3; [0033]) and said second dielectric case (any other 148, 138, 122; Figure 3; [0033]) defining a gas passage (142; Figure 3; [0033]) in between, said gas passage (142; Figure 3; [0033]) allowing said processing gas to pass there through in a direction orthogonal to said direction in which said first electrode body (140; Figure 1,3; [0033]) and said second electrode body (any other 140; Figure 1,3; [0033]) extend, as claimed by claim 62

- iii. An electrode structure (Figure 3; [0033]) according to claim 62, wherein said first dielectric case (148, 138, 122; Figure 3; [0033]) and said second dielectric case (any other 148, 138, 122; Figure 3; [0033]) are separately formed, as claimed by claim 63
- iv. An electrode structure (Figure 3; [0033]) according to claim 63, wherein said first dielectric case (148, 138, 122; Figure 3; [0033]) has an opposing surface abutted with said second dielectric case (any other 148, 138, 122; Figure 3; [0033]), and said opposing

Art Unit: 1763

- surface is provided with a recess to serve as said gas passage (142; Figure 3; [0033]), as claimed by claim 64
- v. An electrode structure (Figure 3; [0033]) according to claim 62, wherein said first dielectric case (148, 138, 122; Figure 3; [0033]) and said second dielectric case (any other 148, 138, 122; Figure 3; [0033]) are integrally connected to one another, as claimed by claim 65
- vi. An electrode structure (Figure 3; [0033]) according to claim 62, wherein flow passage (142; Figure 3; [0033]) sectional area of said gas passage (142; Figure 3; [0033]) varies along a direction of gas flow, as claimed by claim 66 – horizontal 142 is shown as a smaller area than vertical 142.
- vii. An electrode structure (Figure 3; [0033]) according to claim 62, wherein said first dielectric case (148, 138, 122; Figure 3; [0033]) is provided with a gas uniformizing passage (142; Figure 3; [0033]) for dispersing said processing gas uniformly in a direction in which said first electrode body (140; Figure 1,3; [0033]) extends and for introducing said processing gas into said flow passage (142; Figure 3; [0033]), as claimed by claim 69

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1763

4. Claims 67 and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Denes, Ferencz S. et al. (US 20030129107 A1) in view of Anders; Andre et al. (US 6137231 A). Denes is discussed above. Denes does not teach:

- i. An electrode structure (Figure 3; [0033]) according to claim 62, wherein said first dielectric case (148, 138, 122; Figure 3; [0033]) has a plate (138; Figure 3; [0033]) dividing said gas passage (142; Figure 3; [0033]) and said first internal space (volume occupied by 140; Figure 3), and a thickness of said plate (138; Figure 3; [0033]) varies along a direction of gas flow in said gas passage (142; Figure 3; [0033]), as claimed by claim 67
- ii. An electrode structure (Figure 3; [0033]) according to claim 62, wherein a distance between said first electrode body (140; Figure 1,3; [0033]) and said second electrode body (any other 140; Figure 1,3; [0033]) varies along a direction of gas flow in said gas passage (142; Figure 3; [0033]), as claimed by claim 68

Anders teaches a similar plasma source array (Figure 9). Specifically, Anders teaches a thickness of said plate/electrode (164/162; Figure 9) varies along a direction of gas flow in said gas passage (from 160 to outside of the structure; Figure 9).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to dimension Denes's plate/electrode such that a thickness/distance varies along a direction of gas flow in said gas passage.

Motivation to dimension Denes's plate/electrode such that a thickness/distance varies along a direction of gas flow in said gas passage is for forming high quality films resulting from a "constriction" (column 4, lines 54-67; column 3, lines 1-13)

Art Unit: 1763

***Conclusion***

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272-1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (571) 273-8300. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.



8/10/6